Innovation @ WSTF 2011

NASA White Sands Test Facility Valve Repair Facility

At NASA White Sands Test Facility (WSTF), the Hardware Processing Component Services Section (CSS) is responsible for the disassembly, cleaning, maintenance, reassembly, and testing of pressure relief and pressure safety valves in compliance with American National Standards Institute (ANSI) National Board Inspection Code (NBIC)/NB-23. The cleaning process is approved for oxygen service, International Space Station (ISS), and space shuttle support. The system performs functional tests on all rebuilt components and allows technicians to do set point verification on pressure relief and pressure safety valves to pressures over 10,000 psig.

As a manned space flight test facility since the 1960s, WSTF has a requirement for items used in site test systems to be precision cleaned. To properly clean a component, it must be fully disassembled, each piece part cleaned, reassembled, and functional tested. This became a problem when the standard for NASA ground-based pressure systems required that pressure systems must be NBIC-compliant and all relief valves in a code application must meet NBIC requirements. The valves have to be manufactured according to NBIC-code, and WSTF also maintains clean given the location of the code facility. The valves have a tamper-proof seal and if the seal is broken, the valve is no longer code compliant. WSTF faced conflicting requirements as there was no NBIC-approved valve repair (VR) facility that could maintain clean during testing. It was a vicious cycle because if WSTF cleaned the code valves once received, the valve would be out of compliance. To make the valve code compliant again, it would have to be sent to a VR facility that would in turn contaminate the valve. To solve this problem, WSTF built its own VR and flow facility in a class 100 clean room, which meets the requirements of the National Board of Boiler and Pressure Vessel Inspectors.

WSTF's VR Facility team worked innovatively to meet the National Board's NBIC requirements, received "VR" certification in February 2010, and now holds the NBIC Certificate of Authorization and "VR" Symbol Stamp to repair and refurbish code-stamped pressure relief valves. Only facilities certified by the NBIC can perform relief valve refurbishment and retain the valve's code stamp. Unique to WSTF, and to NASA, is receiving "ownership" of the "VR" stamp from the National Board. WSTF also worked closely with National Board to develop a Quality Control Manual for the facility.

The VR Facility ensures relief valves are operating within the manufacturer's specifications and to the customer's expectations. The facility is capable of verifying flow capacities of pressure relief valves up to 1000 scfm, and pressures not to exceed 2800 psig, using clean gaseous nitrogen. Because assembly and testing of the relief valves is performed in a Class 100 clean room environment, it makes WSTF the only known clean flow test facility in North America. WSTF's one-of-a-kind VR facility offers support to other NASA centers and is bringing in new business to WSTF.

The Valve Repair Facility also provides replacement parts control. This ensures parts being used for relief valve repair are replacement parts from the original manufacturer, or a vendor approved by the National Board, to make replacement parts that meet the original manufacturer's specifications. WSTF maintains traceability for parts and testing on code and non-code applications. All inspection measurement and test equipment used to support the VR facility is calibrated at WSTF and is traceable to National Institute of Standards and Technology or other internationally agreeable intrinsic standards.

WSTF's VR Facility exceeds industry standards and is positioned to be ready for advancements in materials that will be lighter and hold more pressure than current materials.